Exercise 1
Creating a Questionnaire

Characteristics of the Exercise

Objectives:	At the end of this exercise the student will be able to:

- Create a new project
- Add a new view to the project
- Add variables to the view
- Set properties on variables
- Create legal values
- Add and rename pages

- Use check code
- Save the view
- Improve the questionnaire design
- Add groups

Level:	Beginner
Time:	Approximately 2 hours
Resources:	None

Part 1 Creating a Project

✓ Epi Info 2002 organizes databases in projects. A new project can be created at the same time a questionnaire is set up.

✓ A project contains many views, and each view shows information about one data table.

Step 1: Create a new questionnaire

a. To create a new project, click on the button labeled ***Makeview*** from the main Epi Info 2002 menu.

b. A window with a menu bar and blank space below is now displayed. To create a new view, right click on the blank space and then select the ***Make New View*** button.

c. When the Create or Open PROJECT Dialog box is displayed, type *Obstetrics* in the File Name space and click ***Open***. You have now created a project called *Obstetrics*.

d. Epi Info will then ask you to create (Name) a new view. Type *Prenatal* in the **Name the View** dialog box and click *OK* when done. You have now created a *view* called *Prenatal*, which is contained in the *Obstetrics* project.

Step 2: *Creating fields in the questionnaire*

a. Add the following variables to your view by right clicking on the blank space (the new field will appear wherever you click). A **Field Definition** dialog box appears.

b. Refer to the table below, type in the Question or prompts, choose a variable type and follow the comments (if any). Then click *OK*.

Question or Prompt	Type	Comments
Obstetrics and Gynecology	Label/Title	Bold, Italic, Size 12
Patient Information	Label/Title	Bold, Size 18
Patient ID	Number	Pattern ##
Last Name	Text	
First Name	Text	
Middle Initial	Text	Resize it to allow only three letters (See the comment below the table)
Title	Text	
Health Facility	Text	
Email	Text	
Address	Multiline	
Phone Number	Phone Number	###-###-####
Fax Number	Phone Number	###-###-####
County	Text	

✔ Click the data-entry box (not the prompt), and blue dots (or handles) will appear. Drag any one of these to resize the field.

Step 3: *Moving fields*

a. Left click on the question or prompt of the newly created field, don't click on data entry box. While holding down the mouse button, move the cursor to the new location.

✔ The questionnaire should look like the form represented on the next page.

Some fields are for display only. They are called Labels. They do not hold data.

Text fields receive text or numeric data.

There is a special field type called "phone number.*"*

Address can be a multi-line field type or several single line text fields.

Step 4: *Rename the current page*

    a. Place the cursor on the left side of the screen on the text line **1 Page** and right click. Type the title *General Info* in the box. Click **OK** when done.

✓ Epi Info 2002 can create multiple pages in a single view. Each page can resemble a page in a paper questionnaire or can be used to organize data.

Step 5: *Add a new page to the questionnaire*

    a. To add a new page, click on the button labeled **Add Page** on the left-hand side of the screen.

    b. Add the following fields to the view:

Question or Prompt	Type	Comments
Personal Information	Label/Title	Bold, Size 18
Date of Birth	Date	MM-DD-YYYY
Age	Number	##, Select "Read only"
Marital Status	Text	
Age of Menarche	Number	##
Last Menstrual Period	Date	MM-DD-YYYY
Due Date	Date	MM-DD-YYYY
Maternal leave?	Yes/No	
Days of Vacation	Number	##
Social Security Number	Text	Select "Required"
Smoker?	Yes/No	
# of Cigarettes (per day)	Number	##
Alcohol Consumption?	Yes/No	
Postpartum Depression?	Yes/No	

    c. After all the fields are created, change the title of the second page to *Personal Info.*

✓ The questionnaire should look like the form represented below after adding a group in step 6.

Step 6: Add a group

✓ Epi Info 2002 can create groups of fields for easy manipulation in analysis and logical organization of the questionnaire.

    a. To create a temporary dotted selection box to enclose the three fields shown below, left click above and to the left of *Age of Menarche*, drag the mouse to the lower right corner, and release the mouse button. A dotted line box will appear and should outline the desired location for the group box.

    b. Click on the **Insert** menu and then choose **Group**. Create a name for the group (which will be displayed on the center of the group box) by typing *Menstruation*. Choose a color by clicking on **Set Color**.

Text fields can have legal values.	Personal Information Date of Birth _____ Age ____ Marital Status _____
Some fields will take dates.	*Menstruation* Age of Menarche _____ Last Menstrual Period __/__/____ Due Date __/__/____
Some fields will take only numbers.	Maternal Leave _____ Days of Vacation ____ Social Security Number___ Smoker?____ # of Cigarettes___ Alcohol Consumption?__ Postpartum Depression? ____

✓ The calculated field, *Age*, is read only; nothing can be typed in this cell.

✓ Other properties include: Required, which prevents missing values, Soundex, which provides a code to unify English names that sound alike but are spelled differently, and Repeat Last, which will automatically repeat the last value entered in that field.

✓ To edit a field, right click on the prompt for the field you want to edit.

Step 7: Edit a field and create legal values

✓ Adding **Legal Values** is the easiest way to customize data entry. It creates a table of allowed entries from which the user can choose.

✓ Quality control is maintained for the database while speeding up the process of data entry. Legal values can be created only on text variables.

a. To add legal values to your form, right click on the prompt, *Marital Status*, to edit the variable. Click on the button **Legal Values** located in the lower right side of the pop-up window.

b. You can use a preexisting table or you can create a new one. Click on the **CreateNew** button.

c. Enter values for *MaritalStatus*: Single, Married, Divorced and Other (case sensitive). If the order of entry is the desired order of display, click on **Do Not Sort**, otherwise the list will be sorted alphabetically.

d. Click **OK** to save the Legal Values and then click on **OK** again to save the field properties.

e. From the *General Info* page, for the *County* field, enter the following legal values: *Cobb*, *DeKalb* (case sensitive), *Fayette*, *Fulton* and *Gwinnett*. Do not click on **Do Not Sort** since this list should be sorted alphabetically.

Step 8: Change the background color

a. The background color can be changed by clicking on **Format** and then on **Background** options from the pull-down menu.

b. Click on **Change Color** and choose the color you want. Then click on **OK**. Create a different color background for the other page.

Step 9: Customize the Alignment Grid

✓ To customize the grid, click on **Format** and then on **Settings** from the pull-down menu.

✓ To remove the gridlines, switch **Visible grid on screen** check boxes to off. Note the other available settings.

✓ By default, MakeView will snap all fields to a grid. You can turn off the grid, change the spacing, or remove the visible gridlines from the screen.

Step 10: Manual tab order

✓ The automatic tabbing feature keeps the focus of the cursor according to the layout of the screen. The tabbing feature does not require changing unless the cursor behavior needs to be manipulated manually.

✓ To manually change the tab order, click on **Edit** and then on **Order of FieldEntry** (**TabOrder**). To change the tab order, click on the desired field, and choose either the **Up** or the **Down** button. Then click on **OK**.

<u>Step 11</u>: *Align fields*

✓ In addition to moving fields with the mouse, MakeView provides tools for automatic alignment of fields on the page.

   a. From the *Personal Info* page, *Maternal Leave*, *Days of Vacation*, and *Social Security*, should be horizontally aligned. First create a selection box around the fields you are about to align by left clicking and dragging over the these three fields.

   b. Once the box is created, click on **Format** menu item and then on **Alignment** and **Horizontal**.

Part 2 Calculating values using check code

✓ Check code is used to check for errors, perform calculations, and guide the data entry process. Check code can be written to be very simple or very complicated.

✓ It will be used to calculate the actual age of the mother, and to verify data entry of the social security number. Clicking on the blue button labeled **Program** activates the check code editor.

✓ Check code must be associated with an existing variable, page, view or record. The commands will be executed when the data entry cursor enters or leaves the 0chosen field. The list of variables is available from the drop-down box **Choose field where action will occur**. Variables are organized in pages. Remember that you will not see the question or prompt but only the current variable name.

✓ Variables designated "read only" will not execute check code, so select a variable that is *not* read only (usually a field that is associated with the variable you are programming).

<u>Step 12</u>: *Calculate age (ASSIGN command)*

   a. Age will be calculated using the date of birth and the current date. Make sure you have clicked on the **Program** button and that the check code editor is visible on the screen.

   b. Select the field where check code will be executed. In this case, select *DateofBirth* (from Page 2) from the drop-down list **Choose field where action will occur**. Because *Age* must be calculated based on the date of birth information, leave the default option on the **After** radio button so that *Age* will be calculated after *DateofBirth* data is entered.

   c. Click on **Assign** in the command tree on the left-hand side.

   d. From the **Assign Variable** box, choose *Age.*

e. Fill the assignment using the following elements:

    I. Assign value contains the variable that receives the new value. In this case *Age* is receiving the result of the computation.

    II. The **=Expression** box contains the formula used to calculate age. You can use the Epi Info 2002 function *Years* (to do so, just type *Years* without "=" in front of it).

✓ Functions modify the value of one or more variables to produce a result. Almost all functions require arguments enclosed in parentheses and separated by commas. Where arguments are required, there may not be any spaces between the function name and the left parenthesis.

    III. The function *Years* takes two parameters: the first one is *DateofBirth* (choose from **Available Variables**) and the second one is SYSTEMDATE (a system function that returns the date stored in the computer's clock. SYSTEMDATE should be typed here). The final expression should be:

<div align="center">

Age=Years(DateofBirth,Systemdate)

</div>

f. Click on **OK** when done and then click on **Save** in the program editor window. Then click on **OK** at the top of the screen to exit from the Program.

Step 13: *Validate social security*

➢ The format for the U.S. social security number must be ###-##-####.   All other strings will be rejected. Therefore, the social security number field must have a dash ("-") in the fourth and seventh position.

✓ This can be accomplished by using an Epi Info 2002 function called SUBSTRING(). The syntax is:

<div align="center">

Substring(<Variable>,Pos1,Char#)

</div>

✓ Where <Variable> is the variable, Pos1 is the position of the first character to be extracted from the test variable, and Char# is the number of characters to be extracted. For example, Substring("Epi Info",4,4) will return "Info."

a. Click on **Program** and select the variable *SocialSecurity* from the drop-down box **Choose field where action will occur** (leave default as **After** here).

b. Click on **If** in the command tree on the left-hand side.

c. In the *If Condition* box, type in the Function "Substring" (you can also click on the **Functions** button to see a list of all available Functions).

d. Click on the open parenthesis button *(* and from the ***Available Variables*** drop-down box choose the field *SocialSecurity*. Then type a comma, type 4, and comma again, and then type 1. Click on the close parenthesis button *)* to close the statement.

e. Click on the less than and greater than signs to signify "not equal to" **<>**. Click on the quote button *"* and then click on the dash/minus button **-**. Click on the quote button again *"*. Since the field *SocialSecurity* is text, the value must be enclosed in quotes.

f. Then click on the ***OR*** button

g. Type the Function "Substring" again and click on the open parenthesis button *(* and from the ***Available Variables*** drop-down box choose the field *SocialSecurity*. Then type a comma, type 7, and comma again, and then type 1. Click on the close parenthesis button *)* to close the statement.

h. Click on the less than and greater than signs to signify "not equal to" **<>**. Click on the quote button *"* and then click on the dash/minus button **-**. Click on the quote button again *"*.

i. Click on the ***Then*** button, and then click on the ***Dialog*** button under the *User Interaction* tab.

j. At the *Title* box, type *Use Dashes*. At the *Prompt* box, type *Please use '-' in position 4 & 7 to separate numbers. SSN format should be like ###-##-####*. Click ***OK***.

k. Click on the ***Then*** button again, and then click on the ***GOTO*** button under the *Fields* tab. Choose the *SocialSecurity* and then click on ***OK***.

l. From the IF dialog box, click ***OK*** to accept all the commands. Click ***Save*** to save the check code for *SocialSecurity*. Click ***OK*** at the top of the screen to exit the check code screen.

Checkcode for the *social security* field

```
IF substring(SocialSecurity,4,1)<>"-" OR substring(SocialSecurity,7,1)<>"-" THEN
        DIALOG "Please use '-' in position 4 & 7 to separate numbers. SSN format should be
        like ###-##-####" TITLETEXT="Use Dashes"
        GOTO  SocialSecurity
END
```

m. To exit MakeView, go to ***File*** and choose ***Exit***. At the ***New Data Table*** dialog box, click ***Cancel***.

Exercise 2
Entering Data

Characteristics of the Exercise

Objectives:	At the end of this exercise the student will be able to:
	- Enter data
	- Navigate through programs and records
	- Using the Find/Search feature
Level:	Beginner
Time:	Approximately 45 minutes
Resources:	Exercise 1

Step 1: Opening an existing project

    a. Click on **Makeview** from the main menu and select **File** and **Open**. From the dialog box, identify the project created in Exercise 1 (*Obstetrics.mdb)*, click on it, and then click on **Open**.

    b. Choose *Prenatal* from the list and click on **OK**. The completed prenatal care questionnaire view should appear.

Step 2: Adding data to the questionnaire

    a. From the view (*Prenatal*), click on **Enter Data** located on the **File** option in the pull-down menu. Click **OK** to create the data table for the *Prenatal* view (leave default as "Prenatal" for the data table name*)*.

✓ You will be asked to create the table only once. MakeView executes the Enter program, and you are ready to test your new database by entering data.

    b. Type the following data for the first patient in the *Prenatal* view:

1 Page - General Info		*2 Page - Personal Info*	
PatientID:	01	DateOfBirth:	12/08/1965
Last Name:	Smith	Age:	*Read Only*
First Name:	Jane	Marital Status:	Married
Middle:	B.	Age of Menarche:	13
Title:	Manager	Last Menstrual:	04/01/1999
Health Facility:	Northside Hospital	Due Date:	01/06/2000
Email:	jsmith@aol.com	Maternal Leave:	Yes
Address:	123 Main St	Days of Vacation:	20
Phone:	(404) 555-1234	Social Security:	123-45-6789
Fax:	(404) 555-5678	Smoker?:	Yes
County:	Gwinnett	#ofCigarettes:	12
		AlcoholConsump:	Yes
		Postpartum:	Yes

> ➢ *After completing the first patient, click on the **New** button to enter the next record. Enter the following patients:*

1 Page - General Info		*2 Page - Personal Info*	
PatientID:	02	Date of Birth:	05/21/1968
Last Name:	Jones	Age:	*Read Only*
First Name:	Mary	Marital Status:	Married
Middle:	R.	Age of Menarche:	13
Title:	Homemaker	Last Menstrual:	02/22/1999
Health Facility:	Northside Hospital	Due Date:	11/29/1999
Email:	maryj@yahoo.com	Maternal Leave:	Yes
Address:	456 Lake Way	Days of Vacation:	30
Phone:	(404) 555-1234	Social Security:	123-45-6789
County:	Fulton	Smoker?:	No
		#ofCigarettes:	0
		AlcoholConsump:	No
		Postpartum:	Yes

1 Page - General Info		*2 Page - Personal Info*	
PatientID:	03	Date of Birth:	07/24/1975
Last Name:	Steer	Age:	*Read Only*
First Name:	Anita	Marital Status:	Single
Middle:	L.	Age of Menarche:	11
Title:	Engineer	Last Menstrual:	03/02/1999
Health Facility:	Northside Hospital	Due Date:	12/07/1999
Email:	esteer@aol.com	Maternal Leave:	Yes
Address:	893 Jake Lane	Days of Vacation:	30
Phone:	(404) 555-1234	Social Security:	123-45-6789
County:	DeKalb	Smoker?:	Yes
		#ofCigarettes:	34
		AlcoholConsump:	No
		Postpartum:	Yes

1 Page - General Info		*2 Page - Personal Info*	
PatientID:	04	DateOfBirth:	08/02/1980
Last Name:	Lee	Age:	*Read Only*
First Name:	Jean	Marital Status:	Married
Middle:	P.	Age of Menarche:	14
Title:	Physician	Last Menstrual:	11/12/1998
Health Facility:	Grady Hospital	Due Date:	08/19/1999
Email:	jeanlee@aol.com	Maternal Leave:	Yes
Address:	34 Lake View Way	Days of Vacation:	60
Phone:	(770) 555-1234	Social Security:	123-45-6789
Fax:	(770) 555-5678	Smoker?:	Yes
County:	Fayette	#ofCigarettes:	5
		AlcholConsump:	Yes
		Postpartum:	No

1 Page - General Info		*2 Page - Personal Info*	
PatientID:	05	Date of Birth:	07/02/1980
Last Name:	Kent	Age:	*Read Only*
First Name:	Eloise	Marital Status:	Single
Middle:	P.	Age of Menarche:	12
Title:	Dir of Mkting	Last Menstrual:	12/15/1998
Health Facility:	Northside Hospital	Due Date:	09/21/1999
Email:	eloisek@yahoo.com	Maternal Leave:	Yes
Address:	5741 Bay Circle	Days of Vacation:	35
Phone:	(404) 555-1234	Social Security:	123-45-6789
County:	Cobb	Smoker?:	No
		#ofCigarettes:	0
		AlcholConsump:	No
		Postpartum:	No

Step 3: *Navigating through the questionnaire*

   a. On the left-hand side, under the **Record** section, click on the arrows to navigate the entered records.

✓ The << sign brings the data-entry screen to the first record, while the < sign brings the data-entry screen to the previous record.

✓ Conversely, the > brings the data-entry screen to the next record, and the >> brings the data-entry screen to the last record.

✓ To go directly to a specific record number, click in the white box, type in the record number and click on **Enter**.

Step 4: *Finding a record*

   a. On the left-hand side, click on the **Find** button. A **Find Record** screen appears with a list of all available fields.

   b. Click on the *LastName* field, and a blank field will appear. (Many fields can be selected to search for a particular record. To deselect, click on the selected field again.) Type *Steer* and click **OK** or hit Enter on the keyboard.

   c. A grid appears with the correctly found record.   Double-click on any column to bring the cursor to the data-entry screen of that record.

   d. To exit Enter, go to **File** and choose **Exit**.

Exercise 3
Check Code

Characteristics of the Exercise

Objectives:	At the end of the exercise the student will be able to:

- Identify the fields that should contain check code
- Create code to do computations, enforce conditions, give messages, clear entries, place the cursor as desired and hide fields

Level:	Advanced
Time:	2 Hours, 30 Minutes
Resources:	Exercise 1 & 2

SITUATION

This exercise deals with the obstetrical history of pregnant women, patients for the Obstetrics and Gynecology group. The format is commonly used by PAHO (Pan American Health Organization) in prenatal information systems for obstetrical data collection. The graph below represents an alert for the persons entering data to adhere to logical formatting.
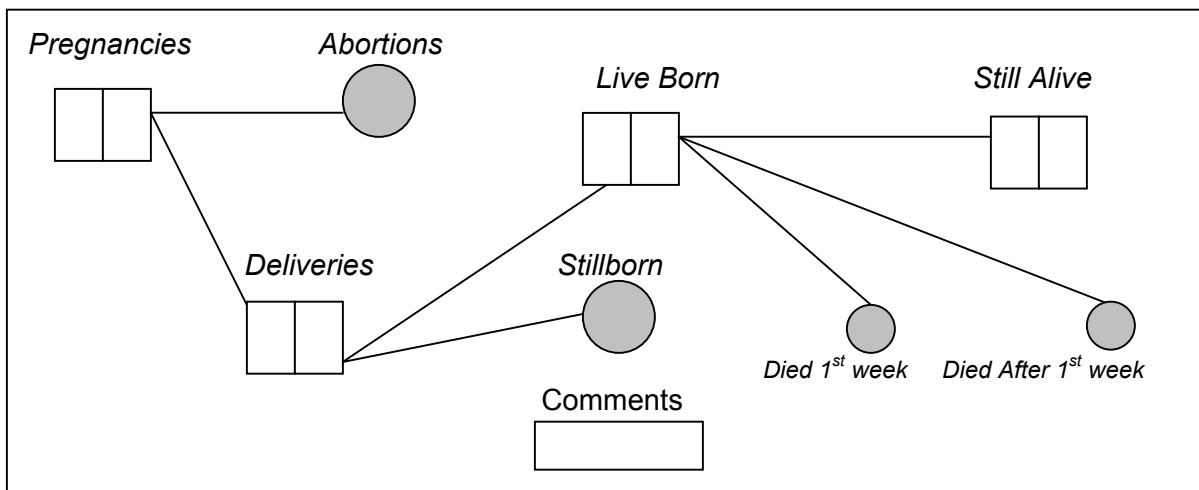
Step 1: Opening an existing project

a. Click on *Makeview* from the main menu and open *Obstetrics.mdb*.

b. Choose *Prenatal* from the view list. Add a new page by clicking on the button labeled **Add Page** in the left side of the screen

c. On this new page, create the following fields:

Question or Prompt	Type	Comments
Pregnancy History	Label/Title	Bold, 18
Pregnancies	Number	##, Bold
Abortions	Number	##
Deliveries	Number	##
Live Born	Number	##
Stillborn	Number	##
Still Alive	Number	##
Died 1st week	Number	##
Died After 1st week	Number	##
Comments	Multiline	

✓ Add groups so that the questionnaire looks like the form represented below.

✓ Adjust the tab order to match the order that the data will be entered.

✓ Change the background color, alignment of fields, and tab order as desired.

d. After the fields are created, change the page name from "3 Page" to *Pregnancy History.*

Step 2 *Developing check code*

✓ The purpose of check code is to enforce quality control and to set rules and conditions for data entry.

Rules
1. The number of *Abortions* should not be greater the number of *Pregnancies*.
2. The number of *Pregnancies* should be equal to the sum of *Deliveries* and *Abortions*.

3. The number of *Live Born* cannot be greater than the number of *Deliveries*.

4. The total of *Live Born* and *Stillborn* should be equal to the number of *Deliveries*.

5. The number of *Still Alive* cannot be greater than the number of *Live Born*.

6. If the number of *Still Alive* equals the number of *Live Born*, then hide *Died 1st week* and *Died After 1ˢᵗ week.*

7. The number of *Still Alive* and *Died 1st week* cannot be greater than the number of *Live Born*.

8. If the number of *Still Alive* plus the number of *Died 1st week* matches *Live Born*, then hide *Died After 1ˢᵗ week.*

Check Code

Abortions
Checkcode

```
IF Abortions>Pregnancies THEN
        DIALOG "The number of abortions should not be greater than the number of
        pregnancies!"  TITLETEXT="Error in number of abortions"
        CLEAR  Abortions
        GOTO  Abortions
END
```

Deliveries
Checkcode

```
IF Pregnancies<>Deliveries+Abortions THEN
        DIALOG "The number of pregnancies should equal the number of deliveries
        and abortions!"  TITLETEXT="Error in number of deliveries"
        CLEAR  Abortions  Deliveries Pregnancies
        GOTO  Pregnancies
END
```

LiveBorn
Checkcode

```
IF LiveBorn>Deliveries THEN
 DIALOG "Liveborns cannot be greater than the number of deliveries that were
reported!"  TITLETEXT="Too Many Liveborns"
         CLEAR  LiveBorn
        GOTO  LiveBorn
END
```

Stillborn
Checkcode

```
IF LiveBorn+Stillborn<>Deliveries THEN
```

```
          DIALOG "The number of livebirth and stillborn should match the number of
          deliveries!"  TITLETEXT="Error in Delivery Outcome"
          CLEAR  LiveBorn  Stillborn
          GOTO  LiveBorn
  END
```

StillAlive
Checkcode

```
  IF StillAlive>LiveBorn THEN
          DIALOG "Still Alive cannot be greater than the number of born alive!"
          TITLETEXT="Error in number of alive"
          CLEAR  StillAlive
          GOTO  StillAlive
  ELSE
          IF StillAlive=LiveBorn THEN
                  HIDE  Died1stWeek  DiedAfter1st
                  GOTO Comments
          ELSE
                  UNHIDE  Died1stWeek  DiedAfter1st
                  GOTO Died1stWeek
          END
  END
```

Died1stWeek
Checkcode

```
  IF StillAlive + Died1stWeek >LiveBorn THEN
          DIALOG "Still Alive plus Died1stWeek cannot be greater than the number of
          born alive!"  TITLETEXT="Error in number of alive"
          CLEAR  StillAlive Died1stWeek
          GOTO  StillAlive
  ELSE
          IF StillAlive + Died1stWeek =LiveBorn THEN
                  HIDE  DiedAfter1st
                  GOTO Comments
          ELSE
                  UNHIDE  DiedAfter1st
                  GOTO DiedAfter1st
          END
  END
```

Exercise 4
Introduction to Relational Databases

Characteristics of the Exercise

Objectives:	At the end of this exercise the student will be able to:
	- Create related views in Epi Info 2002
Level:	Intermediate
Time:	Approximately 2 hours
Resources:	Exercise 1 required

Step 1: Opening an existing project

    a. Click on **Makeview** from the main menu and open *Prenatal* view in *Obstetrics* project.

Step 2: Creating a Relational Button

    a. On the lower left hand side of the screen on page two *(Personal Info)*, create a new variable.

    b. In the prompt field (*Question or Prompt*), type *Follow-Up Visits*, select **Relate** as the variable type, and then click **OK**.

✓ A relational button can also be created by clicking on the button labeled **Related View** instead of selecting **Relate** as the variable type.

Step 3: Setting the relational properties

    a. A form labeled **Conditions for related form to be active** will appear. In the box labeled **Form should be accessible** select *Only when certain conditions are true,* (the default value is *Any time*).

    b. Make sure that the two check boxes are unchecked. Note that when *Only when certain conditions are true* is selected, a new set of fields is displayed.

    c. Click on the drop-down box called **Available variables** and select *PatientID* from the list. Once *PatientID* is selected, it will be displayed on the formula box (labeled *Form can be accessed when…*); click the greater than (>) sign, then click in the formula box, and type *0*. The box should read:

PatientID>0

    d. Click **OK** to accept these instructions. This condition states the second view (child view) will be available for data entry only when the variable *PatientID* contains a number greater than 0.

Step 4: Relating view

a. A new window will allow you to decide if you want to create a new view or relate a view that has been previously created. In this case, only the main view has been created, so accept the default value (*Create a new related view*) and click *OK*.

Step 5: Moving and resizing the button

a. When you place the cursor on the button, instructions to manipulate the button appear.

b. The button will not be highlighted, and no action can be taken since the button can only work in *Enter* and not *Makeview*. If the button is not located in the right place, clicking and dragging it to a new location while pressing the shift key can move it.

c. The button can also be resized. To activate the resize command, click the button while pressing the *Alt* key on the keyboard. A group of small blue boxes will appear around the button for resizing. The *Alt* key does not need to be pressed while resizing it.

Step 6: Creating the related view

a. Now that the main questionnaire is completed, the *Follow-up Visits* view needs to be created. Click the newly created button while pressing the control (*Ctrl*) key.

b. The parent view (*Prenatal*) has been moved to the back, and now the first page (empty) of the new child view (*Follow-up Visits*) is visible.

c. In the new view, create the following fields:

Question or Prompt	Variable Type	Comments
Follow-up Visits	Label/Title	Bold, 18
Visit Number	Number	##
Date of Visit	Date	MM-DD-YYYY
Gestational Age	Number	##
Weight (Kg)	Number	##.###
Blood pressure systolic	Number	###
Blood pressure diastolic	Number	###
Fetal heart beat?	Yes/No	
Fetal Movement?	Yes/No	
Comments	Multiline	

Step 7: Reviewing your work

✔ Two new buttons are now displayed on the left side of the form; one is called **Back** and the other is called **Home**.

✔ The **Home** button will bring the screen back to the first parent record, and the **Back** button will bring the user back to the previous level if there are any nested relationships. Otherwise, **Back** will bring the screen to the first parent record if there is only one level of relationships.

      a. Click on the **Back** button, which will return you to the parent table (*Prenatal*). When **Back** is clicked for the first time, a new window called **New Data Table** will pop up. This dialog box will verify two things:

           1.   To create a data table to store information.

           2.   To verify the data table name. This form will be displayed only once. Click **OK** for accepting the default table, *FollowupVisits.*

Step 8: Entering data for your new relational database system

      a. From the parent view (*Prenatal*), go to **File** and choose **Enter Data**.

✔ **MakeView** executes **Enter** and you are ready to test your new relational database and to enter new data.

✔ Note that at the beginning, the *Follow-up Visits* button (on page three) is not active (grayed out). It will become active only when the *PatientID* field is greater than 0 (on page one).

✔ Child view (*FollowupVisits)* relies on the parent view (*Prenatal*). The only way to enter data for the child view is through the parent view.

      b. Navigate to the record number 1 for *PatientID* number 1 using the shortcut button **<<** on the **Enter Data** screen. It always brings up the first record in the data table.

      c. From page 2 (*Personal Info*), click the *Follow-up Visits* button and enter the following data:

Patient Id	01			
Visit	01	02	03	04
Date of Visit:	06/15/1999	08/15/1999	09/27/1999	12/21/2001
Gestational Age:	10	19	24	35
Weight (Kg):	57.320	61.700	69.120	75.500
BP systolic:	90	110	115	110

BP diastolic:	60	80	85	79
Fetal heart beat:	No	No	Yes	Yes
Fetal Movement:	No	No	No	Yes
Comments:	Pending US 24 wk	BP is increasing		

d. Return to the main view with the ***Back*** button, navigate to record number 2 (> button), and enter the following data. Then enter the related visit data for the other patients.

Patient Id	02					
Visit	1	2	3	4	5	6
Date of Visit:	05/31/99	07/19/99	08/30/99	09/27/99	10/25/99	11/22/99
Gestational Age:	14	21	27	31	35	39
Weight (Kg):	64.5	66.2	68.5	74.2	78.5	80.1
BP systolic:	70	80	82	80	78	84
BP diastolic:	60	60	65	62	65	64
Fetal heart beat:	No	No	No	Yes	Yes	Yes
Fetal Movement:	No	No	No	No	Yes	Yes
Comments:						

Patient Id	03					
Visit	1	2	3	4	5	6
Date of Visit:	04/27/99	05/25/99	06/22/99	09/21/99	10/19/99	11/16/99
Gestational Age:	8	12	16	29	33	37
Weight (Kg):	54	55.5	56.3	59.9	64.35	69.2
BP systolic:	105	110	100	108	112	105
BP diastolic:	48	50	50	55	49	60
Fetal heart beat:	No	No	No	Yes	Yes	Yes
Fetal Movement:	No	No	No	No	Yes	Yes
Comments:						

Patient Id	04					
Visit	1	2	3	4	5	6
Date of Visit:	02/25/99	04/01/99	05/06/99	06/10/99	07/29/99	
Gestational Age:	15	20	25	30	37	
Weight (Kg):	68	70	80	84.500	89	
BP systolic:	125	120	120	128	122	
BP diastolic:	75	50	68	70	80	
Fetal heart beat:	No	No	Yes	Yes	Yes	
Fetal Movement:	No	No	Yes	No	Yes	
Comments:						
Patient Id	05					
Visit	1	2	3	4	5	6
Date of Visit:	04/27/99	05/18/99	07/13/99	08/24/99	09/14/99	
Gestational Age:	19	22	30	36	39	
Weight (Kg):	54	55.5	56.3	59.9	64.35	
BP systolic:	120	110	115	120	130	

BP diastolic:	75	60	68	70	100	
Fetal heart beat:	No	No	No	Yes	Yes	
Fetal Movement:	No	No	No	No	Yes	
Comments:						

Step 9: Understanding table relationships

✓ A one-to-many relationship is used to relate one record in a table (*Patient*) with many records in another (*Follow-up visits*). This is the most common relationship in a database.

✓ A one-to-one relationship links two tables together. It is used to relate one record in a table with one record in another.

✓ Many-to-many relationships can be created as a pair of one-to-many relationships between two tables.

✓ The relate function in Epi Info automatically creates the links between parent and child tables. When analyzing these tables in *Analysis*, Epi Info 2002 will build the proper keys automatically.

Exercise 5
Basic Data Management in Analysis -
Read, List, Sort, Select

Characteristics of the Exercise

Objectives:	At the end of the exercise the student will be able to:
	- Use the basic features of Analysis in Epi Info 2002
Level:	Beginner
Time:	45 minutes
Resources:	Exercise 1 & 2

Step 1: Opening Analysis

    a. To run Analysis, click the ***Analyze Data*** button on the main menu.

✓ Note that all commands are shown in the tree view on the left side of the screen, called Command Generator.

✓ Clicking on a command will bring up a dialog. Responding to the questions and clicking ***OK*** generates and executes a program command automatically in the program editor at the bottom of the screen.

✓ Results appear in the ***Analysis Output*** window above the program editor

Step 2: Reading an existing project

✓ The first command to be used in Analysis is ***Read (Import)***.

    a. Click on ***Read (Import)*** and then click on the ***Change Project*** button at the bottom of the dialog box. Find the project *Obstetrics* and open it. Then from the list of views, choose *viewPrenatal,* and click on ***OK***.

Step 3: Obtaining a line listing

    a. Click on the ***List*** command to create a line listing. There are two ways of displaying a line listing in Epi Info 2002. It can be displayed as a Grid table, which is the default, or as HTM (Web). Try both options in succession.

    b. The asterisk (*) represents all variables available in the database. To list only selected variables, replace the asterisk by the name of the variable(s) to be listed. Note that you can also display "All Except" the listed variables by selecting this option.

Step 4: *Sorting the line listing*

✓ To improve readability of your list, you may want to sort records. The **Sort** command will order the line listing in numeric or alphabetic order by one or more variables.

✓ The sign (++) represents ascending order, whereas (--) stands for descending order.

      a. Sort the database by *Age* (double click on *Age*) in ascending order, and then use **List** to confirm the results.

Step 5: *Selecting a subset of records*

✓ To analyze only women who are married in the database, a subset of the original file must be selected.

      a. Click on the **Select** command and type the expression *MaritalStatus="Married."* Then click on the **OK** button.

      b. Use **List** to show that only three records remain active:

Current View:	**C:\EPI_Info\Obstetrics.Mdb:viewPrenatal**
Select:	**MARITALSTATUS = "Married"**
Sort:	**AGE**
Record Count: **3** *(Deleted records excluded)*	*Date:* **08/08/2001 3:48:19 PM**

Step 6: *Canceling sort and select criteria*

✓ **Sort** and **Select** are active until the user cancels them or a new file is read.

✓ Multiple select is the same as issuing selects with **AND** statement.

      a. Click on **Cancel Sort** command and then on **OK**. This will remove the sort criteria.

      b. Click on **Cancel Select** command and then click on **OK**. This will remove the select criteria. Use **List** again to see the results.

      c. Exit from the Analysis program by clicking the button in the upper left panel.

Exercise 6

Intermediate Analysis: Frequencies, Tables, Means, Program Files, Managing Output

Characteristics of the Exercise

Objectives:	At the end of the exercise the student will be able to:
	- Understand the use of HEADERS, ROUTEOUT and TYPE
	- Save, retrieve and execute .PGMs
Level:	Intermediate
Time:	Approximately 1 hour
Resources:	Exercises 1 & 2

Part I Producing Outputs

Step 1: Routing output to a specific file

✓ Epi Info 2002 displays all outputs as HTML (HTM) documents in a format suitable for most Internet browsers. When output file is not named explicitly, Analysis assigns sequential numbers to the output files and starts a new file with each **Read** or **Closeout** command.

✓ The command **Routeout** allows assigning a name to the output file.

✓ Like any other HTM document, a browser can then open these files. The outputs produced during Analysis are stored in the result library. A hyperlink for the result library is located at the top of the report.

     a. **Read** *viewPrenatal* from Analysis.

     b. Click on the **RouteOut** command (under **Output** folder) in the command tree. In the **Output Filename** box, type *Low Birth Weight Report*.

     c. Click on the **Replace any existing file** checkbox and then click on **OK**.

Step 2: Creating Headers

✓ The **Header** command provides for customizing the output. The text, font, size, color and style (bold, italic, and underline) of all the standard items in the output can be changed.

     a. Apply the following attributes to your output by clicking on the **Header** command in the command tree. From the **Title Line** drop-down box, choose the proper header. Type the title list below in **Title** entry box. Change the **Font Color**, **Font Size** … as listed, and then click on **OK** (for each of the styles below).

     b. Run **Header** command respectively for each of the following rows:

Title Line	Title	Font
0 Body Text		Teal
1 Window Title	Obstetrics and Gynecology	
2 File Title	Risk Factors for Low Birth Weight	Bold, Size 7, Aqua
3 Data Source Title	Published by Obstetrics and Gynecology	Italic, Size 4, Aqua
4 Procedure Title	Analysis of Data	Size 3, Blue
5 Variable Title	Low Birth Weight Risk Factors	Underline, Size 3, Olive

Step 3: Frequencies

a. From the command tree, click on the command **Frequencies**. From the Frequencies form select *Smoker* from the drop-down box labeled *Frequency of*. Click **OK** and note the number of smokers and non-smokers in your dataset.

✓ See the output changes in color, font, size and style on the next page.

Step 4: Means

a. Click on the **Means** command. Select *ofCigarettes* (the variable must be numeric) from the drop-down box labeled *Means of,* and click on the **OK** button.

Step 5: Tables

a. Two variables can be compared using Tables. Click on the command **Tables** and select *Smoker* as the Exposure (Independent variable) and *PostpartumDepression* as the Outcome (Dependent variable). Click on **OK** when done.

Step 6: Defining a new variable

     a. To define a new variable, click on the command **Define.** Type *LBWRisk* (LBW means low birth weight) as the name of the new variable. Then click on the **OK** button.

✔ Variables defined in Analysis are used to hold the results of calculations or conditional statements. The value of the variable will be reset for each record as the program passes through a table. Because this is a standard variable, the last value assigned will be lost at the next **Read** statement.

Step 7: Assigning values to a variable based on condition (IF)

✔ Assign values to the defined variable LBWRisk based on two database variables - smoking and alcohol consumption.

     a. To assign the new *LBWRisk* variable, click on the **If** command. From the **Available Variables** drop-down box, choose *Smoker*.

     b. Click on the equal sign **=** from the code bar on the dialog box, and then click on the **"Yes"** button from the code bar. The *If* command line should look like this:

Smoker= (+)

     c. Click on the **OR** button

     d. Then from the **Available Variables** drop-down box, choose the other risk factor, *AlcoholConsumption.* Click on the equal sign = from the code bar, and then click on the **"Yes"** button from the code bar. The *If* command line should now look like this:

Smoker= (+) OR AlcoholConsumption=(+)

     e. Now click on the **Then** button on the dialog box. From command tree on the left, choose the **Assign** command. An *Assign* dialog box appears.

     f. From the **Assign Variables** drop-down box, choose the newly defined variable, *LBWRisk.* Click in the = *Expression* line.

     g. Click on the **"Yes"** button from the code bar and then click on **Add**.

     h. Click on the **Else** button on the dialog box. From the command tree on the left, choose the **Assign** command. An *Assign* dialog box appears.

     i. From the **Assign Variables** drop-down box, choose the newly defined variable, *LBWRisk.* Click in the = *Expression* line.

     j. Click on the **"No"** button from the code bar and then click on **Add**. Click on **OK** to close the **IF** window.

✓ In the *Program Editor* section, the command you have just created from step *a.* through step *j.* should be displayed like the following text below. You may need to scroll to the bottom of the *Program Editor* to view:

> **IF Smoker= (+) OR AlcoholConsumption=(+) Then**
> **Assign LBWRisk= (+)**
> **ELSE**
> **Assign LBWRisk=(-)**
> **End**

    k. To list the new risk variable and the risk factors, click on the **List** command - choose Web (HTML). From the **Variables** drop-down box, choose *Smoker, AlcoholConsumption,* and *LBWRisk*. Click on **OK**.

Step 8: The Type Command

✓ The **Type** command allows text or a file to be embedded into the Analysis output file. You can add a text file, an HTM file, or your own comments to the output.

    a. Click on the **Type** command and then click on **Browse**. Select the Graphics files type, and choose the *Women2.gif* file (that has been provided for the student) from the Epi_Info folder. Click on **OK**.

    b. Click on the **Type** command again. In the **Text or Filename** box, type *This is the end of the report,* and then click on **OK**.

Part II Working with programs

Step 9: Saving a program file (.PGM)

✓ Note that each command you entered generated one or more lines of program code in the Program Editor at the bottom of the screen.

✓ Programs can be saved internally within the project or externally as a text file with *.pgm* file extension.

    a. In the Program Editor, click on the **Save** button. This button will save the code written in the Program Editor in a special table in the current .MDB called Programs. A saved program can be executed with the Run PGM command or opened in the Program Editor.

    b. In the *Program* box, type *LowBirthWeight*, then type your name in the *Author* box. Before you save, type a brief description of the training exercise in the comments box. Then click on **OK**.

✓ Using the *Save as Text File* option, programs can also be saved in a text file format similar to those for Epi Info 6 for DOS.

       c. After saving the program, exit from Analysis and then come back to Analysis, or simply choose **New** in the Program Editor. Closing and opening Analysis erases the program from memory. Note: if you click **New**, the output will still display the previous report in the *Browser* section.

Step 10: Opening an existing program

       a. In the Program Editor, click the **Open** button. This button will provide a list of programs that were previously saved.

       b. Select "LowBirthWeight" from the **Program** drop-down list. Check that your name and your comments are displayed. Click on **OK**. The program is now loaded into Program Editor.

       c. To open a program that was saved externally, click on the **Text File** button to get a list of available *.PGM* files.

Step 11: Running the program

       a. The program you opened is ready to be executed. Click on the **Run** button to process the program. The program can be edited if desired.

       b. If you make any changes to the program, click on **Save** and save the program under the same name. Exit from Analysis.

✓ In some cases you may want to run only one command at a time. Place the cursor on a particular line, and then click on **Run This Command** button to execute the selected command.

Exercise 7
Read and Write different database formats in Analysis

Characteristics of the Exercise

Objectives:	At the end of the exercise the student will be able to
	- Understand how to open, read and write other file formats in Epi Info 2002
Level:	Intermediate
Time:	Approximately 45 minutes
Resources:	Excel, Html, Dbase, Text and Rec files

Step 1: Opening a project from the Epi Info 2002 menu

    a. From the main menu, click on the **Analyze Data** button.

    b. Click on **Read (Import)**.

Step 2: Reading an Excel table

    a. Click on the **Data Formats** drop-down box and select *Excel 8.0*.

    b. Click on **DataSource** (…), and Analysis will display a window in which you can select the Excel file you want to read. Click on *Jamaica.xls* and then click **Open**.

    c. There are two radio buttons that will allow you to display *Worksheets* or *Named Ranges*. There are three worksheets displayed.

    d. Click on *Sheet1* and then click **OK**. Leave the default option in the box **First Row contains field names**, and then click **OK**. The table contains 70 records.

    e. Verify that you have access to the table by listing the dataset and calculating the **Frequency** of *Sex*.

## *Step 3: Reading and Writing the .DBF file to a table in the current .MDB*

    a. Use the same procedure to **Read (Import)** a *dBase IV* file called *Linear.dbf*.

    b. Click on **Write (Export)**.

✓ The **Write (Export)** command dialog box has several choices.

✓ Selecting **All** means all variables are written to the database.

✓ Selecting *Append* (default choice) under the *Output Mode* means that the data will be appended at the end of the selected database.

✓ Selecting *Replace* means that the data will replace the existing data in the selected database.

    c. Select *Obstetrics* in the *File Name* box via the (…) and click Save. Type *Linear* in the *Data Table* box. Click on the *Replace* choice and click *OK*.

    d. *Read (Import)* the *Obstetrics* project as an Epi Info 2002 or Access dataset. Click on the *All* choice and select the *Linear* table.

    e. View the data using the *List* command.

Step 4: *Reading a table in an HTML page and Writing a permanent link to the HTML table inside the .MDB*

    a. Click on the *Read (Import)* command. Verify that your current project is *Obstetrics* and select *HTML* as the data format desired. Click on *Data Source* (…) to find a table called *ICD9 Cod.htm* and double click on it.

    b. At this time, Analysis displays the list of tables available in the HTML page you selected. The table containing the ICD 9 codes is *Table 7:1*.

    c. Click on *Table 7:1*. Analysis displays a new Web browser window with the content of the table you are attempting to open.

    d. Verify that the table contains ICD-9 codes and their description. Close the Web browser window and click *OK* on *Read* window.

✓ The HTML page is not a part of the current project. A new dialog box appears asking if you wish to create a permanent link to the page or if this is a single visit.

    e. Type *ICD9_LINK*, which is different from *TMPLINK_x*. The link *ICD9_LINK* will be saved just like a regular data table.

✓ By default, Analysis will name the link TMPLNK_x where x is any number. If you name the link, it will be saved, but if you do not want to keep a permanent link to this Web page, click OK and Analysis will delete the link when the project is changed or Analysis is closed.

    f. Read (Import) the Obstetrics project. Click on the All choice and select the ICD9_LINK table.

    g. View the data using the *List* command.

Different Format Files in Analysis
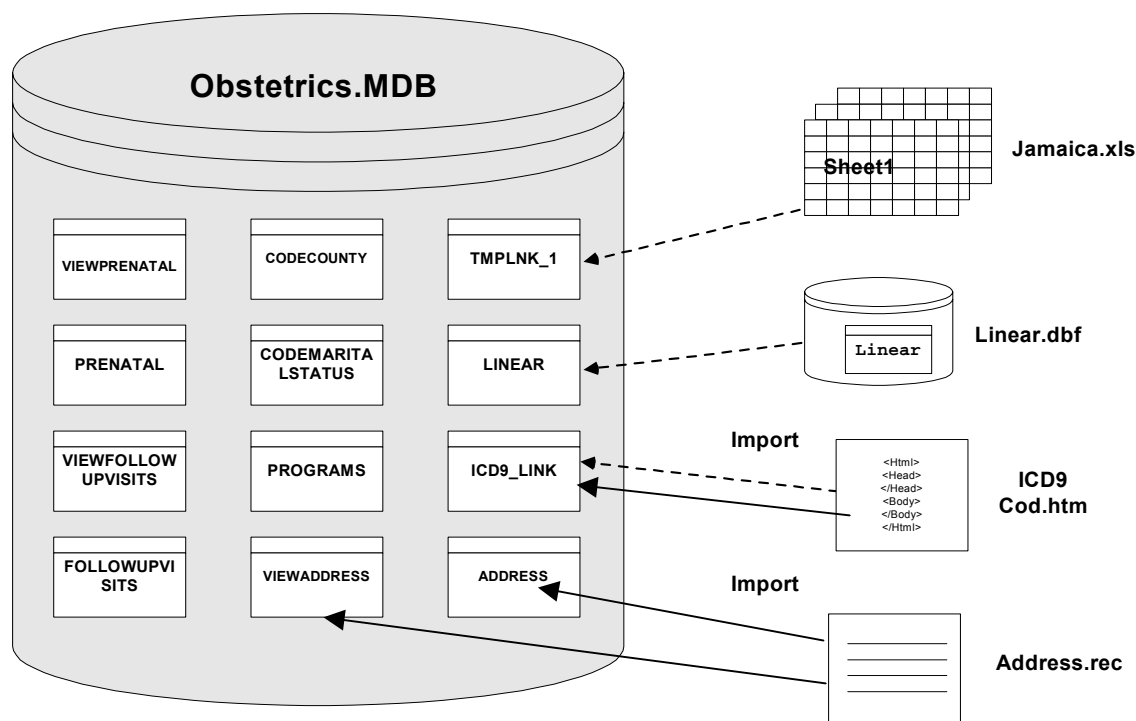
Step 5: Reading (importing) an Epi 6 file

a. Use the same procedure as in Step 2 to read *Address.rec*, an Epi 6 .REC file, choosing Epi6 as the file format.

b. View the data using the *List* command.

c. *Read (Import)* the *Obstetrics* project. Click on *All*. A data table *Address* and a view table *viewAddress* has been automatically created by Analysis.

✓ Note the differences between reading the different file formats. Epi Info 2002 will physically import all records inside the .REC file into a data table with the same name as the .REC file inside the current project. It will also automatically generate a view for that data table.

d. Exit from Analysis.

e. From the main menu, run *MakeView* to see the new view table *Address* in the *Obstetrics* project. Exit *MakeView* when complete.

Exercise 8
Epi Map

Characteristics of the Exercise

Objectives:	At the end of the exercise the student will be able to:

- Create a line map
- Create a polygon map
- Customize each layer
- Save as MAP file
- Copy the image to the clipboard

Level:	Beginner/Intermediate
Time:	Approximately 1.5 hours
Resources:	❑ Exercises 1, 2 & 5
	❑ Download a shapefile from the Epi Info 2002 Web site or from an Epi Info 2002 compact disk (CD)

Part I Using Epi Map interactively
Step 1: *Downloading a .SHP file (shapefile)*

    a. From Epi Info main menu, click on the **Epi Info Website** button and then click on *Maps* from the menu on the left side; or open the Web browser and type in (or paste) the following URL:

         http://www.cdc.gov/epiinfo/Eihlgeog.htm.

If you do not have an Internet connection, you can simulate the same connection by clicking on *Index* in the maps directory of the CD.

    b. Click on the link *Download Free Shapefiles for Epi Map 2002* and click on the *North America* link.

    c. Then scroll down to the US states, by county section and click on the *Georgia* link. A *File Downloading* box appears. Make sure the *Save this program to disk* is selected (if Netscape: *Save As…*). Click **OK**. Then save the file (*ga.exe*) to the Epi_Info folder, or copy the *ga.exe* from CD (*MAPS\USA\ga.exe*) to Epi_Info folder.

    d. From the Windows Explorer C:\Epi_info\, or in My Computer, navigate to the file, and double-click on the *GA.EXE* file. A message that Epi Info will extract files is displayed.

    e. Click on **OK** to continue. Verify that the target directory is c:\Epi_Info and then click on **Unzip**. Click on **OK** when the five files have unzipped successfully. Then click on **Close**.

    f. Close the Web browser and exit from Windows Explorer.

✓ *Ga.exe* has extracted five files constituting the shapefile: *ga.dbf, ga.sbn, ga.sbx, ga.shp* and *ga.shx.*

Step 2: *Opening Epi Map*

  a. From the main menu, click on the **Epi Map** button. Once the map is displayed, click on the **MapManager** - the first button from the left on the task bar or click on *File* and then on *Map Manager*.

Step 3: *Adding layers to the map*

  a. Click on the **Add Layer…** button located at the top of the Map Manager, the first button on the *Map Mana*ger dialog box. From the *Add Layer* dialog box, identify a shapefile called *ga.shp* and click on **Open**.

Step 4: *Creating a subset in another layer*

✓ Since the doctors' office group is located in Atlanta, we only want to select the counties surrounding Atlanta.

  a. From the *Map Manager*, click on the **Add Layer Partial** button. Select *ga.shp,* which is located in the Epi_Info folder. Click **Open** and a window will open containing the counties.

  b. Choose Cobb, DeKalb, Fayette, Fulton, and Gwinnett by holding down the Ctrl key. Then Click **OK**.

  c. Epi Info is now ready to create a new shapefile containing only those counties selected. Use *OBG* as the name for the shapefile. And then click on **Save**.

Step 5: *Changing the color of the OBG layer*

  a. Check that the layer *OBG* is highlighted in the *Map Manager* and click on the **Properties** button. The open window displays six tabs. The default will open to the **Single** tab.

  b. Click on the **Fill Color** box and select a different color from the palette. Repeat this step to change the **Outline Color**. Use contrasting colors such as red and blue to see the differences between both options.

  c. Click on **OK** to implement the color change on the *OBG* layer.

Step 6: *Changing the displaying order*

  a. Now two layers are visible, but the selected counties are exactly superimposed on their corresponding counties in the state map. (You may need to move the *Map Manager* dialog box to see the layers). To move the *OBG* shapefile behind the *Ga* map, click on the *Ga* layer (highlighted), and click on the up arrow button to move the layer. Use the arrow buttons to go back and forth.

Step 7: Hiding, showing and removing layers

✓ To hide one of the layers, click on the box next to the layer name to uncheck it. The polygons are not displayed, but the layer is still in memory.

   a. From the Map Manager, click on the *Ga* layer so that it is selected (highlighted). Then click on the **Remove Layer** button. This removes the layer from memory.

   b. Close *Map Manager*.

Step 8: Maximizing/minimizing the map

✓ The **Magnify** button (fifth button) is a magnifier with a plus (+) sign and the **Minimize** button (sixth button) is a magnifier with a minus (-) sign. The former enlarges the map and the latter reduces it.

   a. Click on the **Magnify(+)** button and then draw a box around the five counties.

Step 9: Displaying labels

There are two ways of displaying labels in Epi Map.

Case 1: Displaying non-printable labels

   a. In the lower right border of the map, click on a box labeled **Map Tips**. Two combo boxes will appear. The first one allows selecting the layer and the second selects the field in the DBF component of the shapefile. Select *OBG* as layer and *Name* as field.

   b. Place the mouse over any of the counties represented in the *OBG* layer. A tool tip with the name of the county will pop up. Select another field and the data will display the changes.

Case 2: Displaying printable labels

   c. To display the county name on the map as label, click the **Map Manager** button, select *OBG* layer, and select **Properties**.

   d. From the **Single** tab, change the color of the map to *White* within the **Fill Color** box. Click on **Apply**. Click on the **Std Labels** tab, and in the box labeled **Text Field** be sure *Name* (county name) is selected. Click on **Apply** and then on **OK**. Close the **Map Manager**.

Step 10: Finding county

   a. On the toolbar there is a set of binoculars, representing the icon for **Find**. Click on it.

b. The new window contains a box at the top labeled "***Enter a search string...***".
Type *Cobb* (case sensitive) and then click on ***Find***. Click on ***Highlight*** and
Insert Pin to show where the *Cobb* is located on the map.

c. Click on the ***Zoom To*** button to get a close view of Cobb county.

d. To find a new county, type *Gwinnett* in the box labeled ***Enter a search string...***
and click on ***Find***. Click on ***Pan To***. It brings the county found to the center of
the screen.

e. Close the *Find* window when done.

Step 11: *Obtaining information about the county*

a. The toolbar button for ***Information*** is a black dot with an ***i***. Click on it and then
click on any polygon. This feature will display information on the county
selected that is contained in the shapefile (actually in the .DBF file that is part
of the three to five files constituting the shapefile).

Step 12: *Changing the background of the map*

✓ At the top section of the *Map Manager*, notice the two tabs, ***Layers*** and ***General***.
Currently, the ***Layers*** tab is on top.

a. At the top section of the *Map Manager*, click on the ***General*** tab and select any
color for the background.

b. Return to the ***Layers*** tab.

Step 13: *Clearing all layers*

a. Now remove all layers at once by clicking on ***Clear all Layers***.

b. Close Epi Map 2002.

Part II Manipulating data in Analysis to generate maps

Step 14: *Aggregating data*

a. From the main menu, click on ***Analyze Data***. Click on ***Read*** (***Import***). Click on
Change Project to select *Obstetrics.mdb* as the current project and choose the
Prenatal view.

b. Click on ***FREQuencies*** and select the variable *County*. In the ***Output to Table***
text box, type *Freqcounty* and click on ***OK***.

c. Click on ***Read*** (***Import***) and then click on ***All*** (not Views) to see the new table.
Choose Freqcounty from the list. Click on ***OK***.

      d.   Click on *List* and choose *Allow Updates*. Click on *OK*.

✓ Currently, there is only one patient from each county in the *Obstetrics.MDB*, and for the purpose of this exercise, we will increase the number of patients from each county. This step is necessary so that the map will display a realistic and varied number of patients in the surrounding counties.

      e.   Change the data in the *Count* column (using the following data) and then close the view of the grid.

Cobb:	2
DeKalb:	30
Fayette:	82
Fulton:	136
Gwinnett:	198

Step 15: Displaying a map from Analysis

      a.   From the command tree in Analysis, click on *Map.*

✓ The database containing the count of cases per county contains only one record per geographic entity. The only analysis available for aggregated data is the total (sum) of cases.

      b.   Select *Sum* from the list labeled as *Aggregated Function* or check the box *1 record per geographic entity*.

✓ The geographic variable is a mandatory variable that contains information common to the shapefile and your database. In this case, the common field is called *County* and it contains the name of each county.

      c.   Select *County* from the *Geographic Variable* drop-down box from the left-hand side of the screen.

✓ The data variable is a numeric field that contains the values you want to display in the map.

      d.   Select *Count* as the variable for the *Data Variable* field.

✓ Information regarding the database is located on the left side of the form. The right side of the form is reserved for the shapefile. The next set of steps will allow you to select the characteristics of the shapefile.

      e.   Identify the box labeled *Shape File* and click on the (*…*) button. From the dialog box select the file *OBG.shp*. Click *Open*.

✓ Note that *OBG.shp* is the same shapefile you created earlier in this exercise. If you do not have this file, go back to Step 4.

✓ After the shapefile is selected, the box ***Geographic Variable*** contains a list of all possible fields that can be used to link your data to the map.

      f.   Select *Name* from the list, and a sample of the content (in this case *County Names*) will appear. You do not need to click any of these values; this data informs you about the type of contents in the field selected.

      g. Click on ***OK*** to finalize the task.

Step 16: Changing your map type to Dot Density

✓ Epi Map can also display data as a Dot Density map.

      a.   To transform the OBG counties Choropleth map into a Dot Density map, click on ***Map Manager***, and click on ***Properties***.

      b.   Click on the ***Dot Density*** tab. Change the ***Dot size*** to *5*. If you wish, you can change the colors. When done, click on ***Apply*** and then on ***OK***.

✓ Each dot is randomly placed in the polygon. To pinpoint it in specific locations, use the Add Points feature. (See below)

      c.   Close ***Epi Map*** and exit Analysis.

Step 17: Loading polygons from an existing shapefile

      a.   From the Epi Info 2002 menu, click on ***Epi Map*** and load the *OBG.shp* file from the ***Map Manager***.

Step 18: Adding data to polygons

      a.   Click on the ***Map Manager*** and then click on the ***Add Data*** button. Select the *Obstetrics.MDB* file and add data located in the *Freqcounty* table.

      b.   On the left-hand side, choose *Name* from the ***Shape Fields Geographic Field*** column. From the middle section, choose *County* from the ***Freqcounty Columns Geographic Field*** column. On the right hand- side, choose *Count* from the ***Freqcounty Columns Render Field*** column. Click on ***OK***.

Note that at this point we have learned two different ways to display information on a map. The first way, (Step 15), sends the information directly from Analysis to Epi Map. The second way, (Steps 18), uses Epi Map interactively and retrieves information from the database without using Analysis.

Step 19: *Changing the Choropleth settings*

  a. From the *Map Manager*, click on the *Properties* button. Click on the
     Choropleth tab. The default values are from white to blue, and the default
     number of classes is five.

✓ Data in Choropleth maps can be displayed two ways; one is automatic and the other is
  customizable.

  b. Epi Map 2002 allows displaying data in Percentiles. To activate the percentile
     distribution, check the box labeled *Quantiles* located below the *Reset Legend*
     button.

  c. Left of the *Color ramp* is a drop-down box labeled *Number of classes*.
     Change it to eight and click on the *Reset Legend* button. Click on *Apply* to
     make changes on the map.

✓ Note that while the option *Quantiles* is checked, the ranges are grayed out. To define
  your own ranges (customized), uncheck the *Quantiles* option.

  d. Change the *Number of Classes* back to *Six*.

  e. Select the *Start* color to *light yellow* and the *End* color *dark brown*.

  f. Click on the *Reset Legend* button. Click on *OK* to make changes on the map.

Step 20: *Changing the properties for the legend*

✓ The legend can be modified from the *Map Manager* using the *Composition* button.

  a. Click on *Map Manager* and *Composition* button

✓ The *Composition* button has five properties:

  o Class break legend: displays the color range and the values
  o Dot density legend: displays the value for each dot displayed
  o Unique Values legend: displays only after a unique value map is rendered
  o North arrow: displays the north arrow
  o Scale bar: in geo-referenced maps, displays the scale of the map
  o Tic marks: displays horizontal and vertical gridlines on the map
  b. Click on the last three check boxes and then click on *OK*.

Part III Saving maps in different file formats

Step 21: *Saving map as image*

✓ You can save the map as a .BMP image.

a. Close the **Map Manager** (if it is open) and from the pull-down menu, click on **File** and then on **Save as Bitmap file**. Assign a name to your map and click on **Save**.

b. Open Windows Explorer and double-click the BMP or GIF files to view (they are in the C:\Epi_info\ folder)

Step 22: *Saving map as an interactive (.map)*

a. To save this map as a MAP file, click on **File** and then on **Save Map File**. Name this map *OBGRF*. Click on **Save**.

✓ Map files save the names of the shapefiles and related data files together with properties of the map that may have been set. The advantage of saving a MAP file over a BMP is that Epi Map 2002 will update the data on the map every time you open it.

Step 23: *Sending an image to the clipboard*

✓ It is possible to copy the map to the clipboard and then paste the map into another application (such as PowerPoint®, Microsoft Word®, Corel Presentations®, or Harvard Graphics®).

a. Close the **Map Manager** (if it is open) and click on **Edit** and then **Copy Bitmap to the Clipboard**. Select the target application and paste the image. Close **Epi Map.**

Exercise 9
Data Management: Cleaning a Database

Characteristics of the Exercise

Objectives:	At the end of the exercise the student will be able to:
	- Use the write and Merge commands to clean up a data table containing undesired information
Level:	Advanced
Time:	Approximately 1 hour
Prerequisites:	❑ Read
	❑ Relate
	❑ If Then statement
Resources	At the beginning of the exercise the student must be familiar with basic Analysis. This exercise is oriented to teach Merge and Write.

Step 1: *Introducing the Refugee system*

Epi Info 2002 comes with a MDB file called *Refugee*. It contains an Epi Info 6 Surveillance system for refugees. The table *Family* contains information concerning the refugee families that have arrived to the United States (e.g., the language they speak or their country of origin).

There is a variable called *Entry*, which reports the port of entry to the United States - there are five ports of entry: Miami, New York, Chicago, Los Angeles, and Mobile.

When the system was designed, no legal values were added to the *Entry* field - a text variable type. As a result, inconsistent data was entered. Some entries were typed in by state (i.e., California), whereas other entries were entered via abbreviation of the state (CA). Another entry was typed in as a city rather than a state.

Step 2: *Reading viewFamily*

a. From **Analyze Data**, change your current project to *Refugee.mdb* and **Read (Import)** *viewFamily*.

Step 3: *Obtaining values of entry*

a. Display the values for *Entry* (use **Frequencies** command). Your results should look like this:

NEXT PROCEDURE

ENTRY	Frequency	Percent	Cum Percent	
AL	2	0.4%	0.4%	
CA	1	0.2%	0.6%	
CALIFORNIA	67	13.1%	13.7%	
CHICAGO	53	10.4%	24.0%	
FL	1	0.2%	24.2%	
IL	9	1.8%	26.0%	
LA	1	0.2%	26.2%	
LOS ANGELES	6	1.2%	27.3%	
MIAMI	1	0.2%	27.5%	
NEW YORK	248	48.4%	76.0%	
NY	123	24.0%	100.0%	
Total	512	100.0%	100.0%	

Step 4: *Identifying the desired values for Entry*

✓ Because the values are inconsistent, a standard must be set for the states and cities. For example, looking at the **Frequency** table above, we have a mix of states and cities, (some spelled out and some are abbreviated). The goal is to convert (or recode) the values to the correct state abbreviations. They are:

     AL
     CA
     IL
     FL
     NY

✓ Because correcting each state one by one would be time consuming, use Analysis to fix the errors in the database.

Step 5: *Recoding the selected field*

    a. Select the **Define** command from the Analysis menu tree.

    b. Create a variable named *NewEntry* without any spaces. Use default standard variable type.

✓ *NewEntry* variable has now been created. The next step is to recode the *Entry* values into the new variable, *NewEntry*.

      c. Select ***Recode*** command from the Analysis menu tree.

      d. Select *Entry* as **From** variable and *NewEntry* as **To** variable.

✓ The first column (*Value*) holds the original values. The second column is ignored because we are working with a text variable. The third column (*Recoded Value*) will hold the new values.

      e. Using the table below, recode the state names, abbreviations and city names into the new values (i.e., the five abbreviated states).

✓ Be sure to include the unchanged values in recode (i.e., recode *NY* to *NY*), otherwise, those values will be considered NULL.

AL	➔	AL
CA	➔	CA
CALIFORNIA	➔	CA
CHICAGO	➔	IL
FL	➔	FL
IL	➔	IL
LA	➔	CA
LOS ANGELES	➔	CA
MIAMI	➔	FL
NEW YORK	➔	NY
NY	➔	NY

      f. When finished with the recoding, select ***OK*** to exit the ***Recode*** dialog box. (Create a ***Frequency*** on the *NewEntry* variable to make sure the values have been correctly recoded).

Step 6: Using assign

✓ The values contained in the *Entry* variable can be overwritten with the values from *NewEntry* variable. (If a mistake is made during this step, the working file can be abandoned, and the original file can be re-read into Analysis.)

      a. Select the ***Assign*** command from the Analysis menu tree.

b. Select *Entry* as **Assign Variable** and select *NewEntry* as **Available Variable**. Click on **OK.**

✓ This step will copy the values from the *NewEntry* variable to the *Entry* variable, overwriting information contained in the *Entry* variable.

Step 7: Saving the changes

✓ The **Define** and **Recode** commands create temporary variables and values. Closing Analysis and reading another table or database will erase any defined or recoded variables.

✓ To keep the new variables that were defined, use the **Write (Export)** command.

a. Select the **Write (Export)** command from the Analysis menu tree.

b. Select **Replace** under **Output Mode**. Locate *Refugee.MDB* by clicking on the (…) button near **File Name**. At the line **Data Table**, create a new table called, *Entryfixed*.

c. **Read (Import)** *Entryfixed* to verify that the table was saved properly. Remember to click on the **All** radio button to see the new table (a new View has not been created for it yet). **List** the table and verify that the data table was saved properly.

Step 8: Merging the changes

✓ Now there are two tables containing different information about port of entry (or state). The *ViewFamily* contains the original information, and *Entryfixed* contains a standard of abbreviated states as the port of entries.

a. To merge the change from *Entryfixed* to *ViewFamily*, read *ViewFamily.*

b. Click on the **Merge** command in Analysis. The form displayed resembles the **Read**/**Relate** command. Select *Entryfixed* as the table you wish to merge (click on the **All** radio button).

c. Click on the **Build Key** button, and select the *Famidnum* as the unique key for both the current table and the related table. Click on **OK**.

d. Back in the merge form, notice that there are two check boxes labeled **Append** and **Update**. Uncheck the **Append** box. Click on **OK**. It will take a few seconds to update all 539 records.

e. **Read** the *viewFamily* again, and check that the changes were incorporated into the *Entry* field.

Exercise 10
Creating a Menu
Developing Applications in Epi Info 2002

Characteristics of the Exercise

Objectives:	At the end of the exercise the student will be able to
	- Create a new menu for the doctors offices in the Obstetrics and Gynecology Clinic
Level:	Intermediate
Time:	Approximately 1 hour
Resources:	Exercises 1 & 2, 6, 8

Requirements

The Obstetrics clinic menu should contain five buttons:

- ✓ Edit Database
- ✓ Patient Info
- ✓ Results
- ✓ Atlanta Map
- ✓ OBG Web Page

It should also contain:

- ✓ Background Image

<u>STEP 1</u> *Creating a new menu*

      a. From Start, Programs, Accessories, NotePad – open EpiInfo.mnu file from the Epi_Info directory. Under the **File** menu item, choose **Save As…** and type *OBG.mnu* in the *File Name* box.

<u>STEP 2</u> *Adding menu items and options to the pull-down menu*

      a. Find the first line of the program and change it from *MENU EPI INFO 2002* to *MENU OBG*. This creates a title for the menu frame.

      b. Identify the beginning of the pull-down menu. It is the first *Begin* in the program. Right below this first *Begin*, add the group of MENUTIEMs and commands below:

```
POPUP "&OBG program"
BEGIN
        MENUITEM "Edit Database", Editdatabase
        MENUITEM "Patient Info", Patientinfo
        MENUITEM "Results", Results
        MENUITEM "Atlanta Map", Atlantamap
        MENUITEM "OBG Web Page", OBGwebpage
END
```

✓ **POPUP** command is used to define a main menu that will appear on the top line of the window.

✓ The individual **MENUITEM** command is used to define the pull-down menu within the **POPUP** item.

STEP 3 *Replacing buttons*

✓ The command **Button** creates a button on the screen with the caption of the display label.

  a. Identify the BUTTONs section in the menu file and replace all the commands with the following BUTTONs below:

```
BUTTON "Edit Database", Editdatabase, 5, 67, "Edit the patient
   questionnaire"
BUTTON "Patient Info", Patientinfo, 5, 78, "Open the patient questionnaire"
BUTTON "Results", Results, 5, 89, "Run the .PGM file"
BUTTON "Exit", Exit, 95, 56, "Exit OBG Program"

BUTTON "Atlanta Map", Atlantamap, 95, 67, "Display the patient map"
BUTTON "OBG Web Page", OBGwebpage,95, 78, "Link to office web page"
```

✓ The two numbers (in percentage) in the command are the location of the button on the screen.

  b. Delete the last button: "Epi Info &Website."

STEP 4 *Adding the command blocks*

✓ The command block starts with the block name, and then the BEGIN-END pair encloses the executable commands.

  a. Add the command block section below, at the top of all the commands in the *Obg.mnu* file:

```
EditDatabase
Begin
DIALOG  "Please  check  with  the  application  developer  before  making  any
   changes to the database!"
      Execute Makeview.exe c:\Epi_Info\ obstetrics.mdb: prenatal
End
```

```
PatientInfo
Begin
    Execute Enter.exe c:\Epi_Info\Obstetrics.mdb: prenatal
 End

 Results
 Begin
    Execute Analysis.exe 'c:\Epi_Info\Obstetrics.mdb': "LowBirthWeight"
 End

AtlantaMap
Begin
     Execute Epimap.exe c:\Epi_Info\obgrf.map
End

OBGWebpage
Begin
     Execute iexplore.exe File:///C:\Epi_Info\Low Birth Weight Report.htm
End
```

STEP 5 *Saving your work*

    a. Click on save and close the text editor.

STEP 6 *Creating a shortcut*

    a. From the desktop, right-click and select **New** and then **Shortcut**.

    b. Click on the **Browse** button, and find the *EpiInfo.exe* file located in c:\Epi_Info and click on **OK**.

    c. Add the following text (*obg.mnu*) after EpiInfo.EXE so that the command line will read:

C:\EPI_INFO\EPIINFO.EXE OBG.MNU

    d. Click on **Next** and then replace the name for the shortcut with *Obstetrics*.

    e. Click on **Finish**.

STEP 7 *Changing the picture*

    a. Double click on the icon you just created.

    b. In the pull-down menu, click on **Edit** and then on **Picture**.

    c. Select the picture from Epi_Info folder called *OBGYN.jpg*.

    d. Click **Open**.

Workshop Exercise I
Advanced Analysis
Developed by Juan Carlos Zubieta, MD, MPH
Edited by Andrew G. Dean, MD, MPH
Integrating Epi Info into Epidemiologist's Daily Work

Characteristics of the Exercise

Objectives:	At the end of the exercise the student will be able to
	- Analyze data using Frequency, Means and Select
Level:	Advanced
Time:	Approximately 2 hours
Resources:	Exercises 5, 6 & 7

Please Read(Import) into Analysis the ESMortality.MDB file (table: *FiveWeeks2002*) that is accompanied with the course materials. The Mortality.MDB file is a database with information about diseases and mortality in El Salvador, which contains data from individual death certificates in a limited period in 2002. You can use Epi Info 2002 to answer the following questions.

The answers to the questions are found at the end of this exercise.

1. How many deaths are there in total?   Answer

2. What is the distribution of death by sex?   Answer

3. What is the mean age of death in the country?   Answer

4. What is the mean age among children (age less than 18)?

Answer [＿＿＿＿＿]

5. Which province has the highest number of deaths?

Answer [＿＿＿＿＿]

6. Which province has the highest number of female deaths?

Answer [＿＿＿＿＿]

7. Which province has the highest number of male deaths?

Answer [＿＿＿＿＿]

8. What is the leading cause of death in the country?

Answer [   ]

[   ]

9. How can I create a summary table of diagnosis and list each cause of death sorted by descending order?

Answer [   ]

[   ]

10. How many cases of stroke were reported?   Answer [   ]

[   ]

11. How many cases of cancer were reported?   Answer [   ]

[   ]

12. What is the most frequent cancer?   Answer [   ]

[   ]

13. How many poisonings were reported?   Answer [____]

14. What is the agent most frequently responsible for fatal poisonings?

           Answer [____]

15. What is the general mortality rate per province?

           Answer [____]

Answers:

1. How many deaths are there in total?	489: Locate Record Count
2. What is the distribution of death by sex?	177 Female, 306 Male, 6 Unknown: Frequency by Sex
3. What is the mean age of death in the country?	46.73: Means of Age_Years
4. What is the mean age among children (age less than 18)?	3.71: Select Age_Years<18, Means of Age_Years
5. Which province has the highest number of deaths?	San Salvador with 192: Cancel Select, Frequency by Province
6. Which province has the highest number of female deaths?	San Salvador with 72: Select Sex="Female", Frequency by Province
7. Which province has the highest number of male deaths?	San Salvador with 120: Cancel Select, Select Sex="Male", Tables with Province by Sex
8. What is the leading cause of death in the country?	Head Trauma level III with 36: Cancel Select, Frequency of Diag
9. How can I create a summary table of diagnosis and list each cause of death sorted by descending order?	Frequency of Diag Outtable to Diagnosis table Read Diagnosis table Sort Count Descending List All

10. How many cases of stroke were reported?	32: Read FiveWeeks2002 table, DEFINE Stroke
	IF Findtext("Stroke",Diag)>0 THEN
	   ASSIGN Stroke= (+)
	ELSE
	   ASSIGN Stroke= (-)
	END
	Frequency Stroke

11. How many cases of cancer were reported?	12: SELECT Findtext("Cancer",Diag)>0
12. What is the most frequent cancer?	Lung Cancer with 3: Frequency of Diag
13. How many poisonings were reported?	14: Cancel Select, SELECT Findtext("Poison",Diag)>0
14. What is the agent most frequently responsible for fatal poisonings?	Fosfamida and Organophosphate both with 6: Frequency Diag
15. What is the general mortality rate per province?	Cancel Select Frequency of Province Outtable to ProvinceTable Read ProvinceTable Relate to ES.dbf (component of shapefile) Build Key Province::Admin_Name Permanent Link: Prov Define Rate ASSIGN Rate=COUNT/POP_ADMIN*100000 LIST Province COUNT Rate

Workshop Exercise II
Analyzing the Content of a Grid Table

Characteristics

Objectives:	At the end of this exercise the student will be able to:
	- Analyze data in a grid
Level:	Intermediate
Time:	30 minutes
Resources:	Understand how a grid is created in Makeview; understand relational database

✓ Grid in a data entry screen creates a related data table. The relationship is maintained by Epi Info 2002 (in *Enter Data* and *MakeView)*, and in Analysis the relationship is established automatically with the *Relate* command. Once the relationship is established in Analysis, the resulting table can be analyzed like any other table.

Step 1: Creating a new view with a grid

    a. Use *MakeView* to create a new View called *GridTest* in the *Obstetrics.MDB* project.

    b. Populate the View with four fields: *Name*, *Age*, *Sex* and a grid called *Vaccination*.

    c. The grid table should have the following fields (or column names) – click on *Save Column* after each entry column name:

Question or Prompt	Type	Comments
Vaccination Date	Date	MM/DD/YYYY
Vaccine	Text	
Weight	Number	###
Height	Number	#.##

Step 2: Adding data to the form

    a. Add five records to the *GridTest*. Some records should have multiple vaccinations.

Step 3: Reading the view in Analysis

    a. Read the View *GridTest*.

Step 4: Listing the related table

    a. Using the **List** command in Analysis, view your database. You will notice that there are five fields – three that you created and two used by the system. However, you will not see the Grid table you created.

✓ To view the data contained in the grid table, you must create a relationship between the view and the grid table.

Step 5: Establishing the relationship with the grid table

    a. Select the **Relate** command.

    b. Select *recgridGridTestVaccination* and click **OK**.

✓ Unique Key and Fkey will automatically be used to form the relationship.

    c. Verify that the grid table is now related to the main table by using **List**.

✓ Now that the Grid table has been related to the main table, you can analyze the resulting table as you would any table.

    d. Perform a **Frequencies** to confirm the results.